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EDITORIAL.

Acidity in Coastal Clay Soils.

The coastal alluvium soils are considered the richest soils in Malaya, although, owing to their heavy texture their drainage is restricted. A feature of certain of these soils, which is explained in an article in this number, is that on exposure to air the colour of clay from their lower depths changes within a few minutes from a light blue-grey to a near-black colour, suggesting the rapid oxidation of ferrous sulphide compounds. The study of this feature showed that oxidation of organic coastal clays consequent upon aeration leads to the formation of sulphuric acid and sulphates in sufficiently high concentrations to be toxic to growing plants.

The author points to the desirability, therefore, of removing such compounds from the soil as soon as possible and suggests that the most feasible method should be to wash them out by water movement.

The Future for Derris.

The vicissitudes of the derris market during the past few years have discouraged a number of planters in Malaya. It is a fact that they have sometimes experienced difficulty—usually only temporary—in finding a market for their crop, and there has at times been an unpleasant uncertainty as to the price of their produce which naturally prejudices the cultivation of this crop owing to the impossibility of estimating the profit which may be expected.

With a pioneer crop such as derris, uncertainty is unavoidable, but the fact remains that—as far as our knowledge goes—crops have found a market, and profits have been made, and it would therefore be lamentable, if having done much of the "spade work" of establishing the cultivation of derris as a plantation product, and having established valuable contacts—and we should add, valuable and sympathetic assistance—in the United States of America, the production should fall below the demand. We believe that such will not be the case, but we issue this warning because at a time like the present, when many difficulties face the producer and consumer, and when various restrictions are apt to separate these interested parties, it is always possible that a situation may arise which will discourage producers.

We believe, however, that Malayan producers are on the right road to deliver the class of product for which there is a demand, and we cannot but believe from available evidence that derris is destined to take a permanent and important place in the insecticide market.

In the past few years we have published a number of articles on every aspect of derris production and market. The article which is included in this number sums up the information which has accumulated and will serve as a guide to producers in the cultivation and marketing of their crop.

Original Articles.

NOTE ON THE DEVELOPMENT OF HIGH ACIDITY IN CERTAIN COASTAL CLAY SOILS OF MALAYA

BY

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Reference has been made in previous articles in the *Malayan Agricultural Journal* ([1], [2] & [3]) to the development of high acidity in certain soils of the coastal area of the country; the development of acidity in these soils has always been associated with opening up and drainage but no detailed or quantitative figures have been recorded on the subject.

The results given below were obtained during the investigation of another problem, and do not claim to be exhaustive or complete, but they should serve to draw attention to a factor which may have serious effects on the growth of plantation crops on these soils.

In July 1939 a series of soil samples from an estate situated on coastal clay was submitted for analysis. The results of the routine mechanical and chemical analysis of these soils are given in Tables I and II. They are typical of previous results obtained for the more organic types of coastal clays except that the figures for CaO are low.

Sample M546 was taken from a field which had been opened up and drains cut 200 ft. apart, 3 ft. deep in April, 1939.

Sample M547 was taken from a field which had been opened up and planted in 1930, drains 500 ft. apart and 6 ft. deep.

Sample M548 was taken from a field which at the time of sampling was still under *blukar** and had not been drained.

The most striking feature of the analyses was the high acidity which had apparently developed in the lower depths (3 ft.) of the field opened up and drained in 1930, a feature which was not common to the other fields.

Consequent upon these results a visit was paid to the estate and profile pits 6 ft. deep were examined in various fields. The exposures shown were characteristic of coastal clays in various stages of oxidation, the colour of the clay ranging in depth from a dull light grey to a deep blue-black grey. It was noticeable that freshly dug lumps of clay from the lower depths darkened rapidly from a light blue-grey to a near-black colour within the space of a few minutes. This suggested the rapid oxidation of ferrous sulphide compounds.

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* Secondary jungle growth.

Table I.

Mechanical Analyses (Bouyoucos) of Soils and pH Values.

Sample	Percentage Composition				pH	
	Clay	Silt	Fine Sand	Coarse Sand	Suspension	Solution
M 546 T 6 ins. ...	75	12	7	3	4.1	6.4
Sa 12 ins. ...	82	7	8	3	4.0	6.0
Sb 18 ins. ...	69	17	9	4	4.2	5.8
Sc 36 ins. ...	73	4	13	10	4.5	5.8
M 547 T 1 in. ...	43	17	33	5	4.9	6.6
Sa 6 ins. ...	66	12	15	8	3.9	6.4
Sb 12 ins. ...	74	9	12	6	3.5	4.2
Sc 18 ins. ...	67	8	16	9	3.2	3.6
Sd 36 ins. ...	72	9	11	7	2.7	3.0
M 548 T 6 ins. ...	75	8	10	6	4.0	6.4
Sa 12 ins. ...	78	5	13	4	3.9	6.2
Sb 18 ins. ...	71	13	9	5	4.1	7.0
Sc 36 ins. ...	70	13	10	6	4.6	6.0

Table II.

Chemical Analyses of Soils.

Sample	Moisture as Received	Percentage on Oven Dry Basis					
		Loss on Ign.	Nitrogen	Hydrochloric Acid Extraction			
				CaO	K_2O	P_2O_5	MgO
	per cent.						
M 546 T 6 ins. ...	38.5	14.5	0.14	0.02	0.91	0.03	0.14
Sa 12 ins. ...	53.3	20.1	0.20	0.02	0.72	0.02	0.18
Sb 18 ins. ...	57.9	26.1	0.28	0.04	0.57	0.06	0.18
Sc 36 ins. ...	55.4	26.5	0.17	0.04	0.40	0.04	0.12
M 547 T 1 in. ...	8.9	22.7	0.64	0.12	0.33	0.19	0.03
Sa 6 ins. ...	23.9	9.3	0.21	0.02	0.61	0.05	0.20
Sb 12 ins. ...	30.3	10.9	0.21	0.02	0.83	0.03	0.10
Sc 18 ins. ...	31.4	13.3	0.24	0.02	1.25	0.03	0.26
Sd 36 ins. ...	48.3	18.0	0.20	0.02	1.16	0.01	0.27
M 548 T 6 ins. ...	37.5	13.4	0.17	0.02	0.67	0.03	0.08
Sa 12 ins. ...	42.3	12.8	0.20	0.02	1.51	0.04	0.03
Sb 18 ins. ...	50.0	12.1	0.18	0.01	1.27	0.03	0.08
Sc 36 ins. ...	50.1	14.4	0.18	0.01	1.17	0.02	0.08

Table III.

Alteration in pH Values of Soil Samples on Drying out for one Month and Sulphate Content of Water Extracts.

Sample.	22nd Aug. 1939		22nd Sept. 1939		22nd Sept. 1939.
	Suspension	Solution	Suspension	Solution	Percentage SO_4 in H_2O Extract
M 594 T 0 - 2 ft. ...	4.0	6.8	3.7	4.4	0.06
Sa 2 - 3 ft. ...	3.4	4.2	3.2	3.4	0.08
Sb 3 - 4½ ft. ...	2.9	3.8	2.6	2.8	0.41
Sc 4½ - 6 ft. ...	3.5	4.2	2.6	2.6	0.93
M 595 T 0 - 1 ft. ...	3.8	6.2	3.7	5.2	0.08
Sa 1 - 2 ft. ...	3.6	6.8	3.5	6.0	0.07
Sb 2 - 3 ft. ...	3.6	6.6	3.5	5.6	0.08
Sc 3 ft. - ...	3.4	4.4	3.4	4.2	0.09
M 596 T 0 - 2 ft. ...	3.3	3.6	3.0	3.2	0.05
Sa 2 - 3½ ft. ...	2.7	3.4	2.6	2.8	0.18
Sb 3½ - 4½ ft. ...	2.8	2.8	1.5	2.4	2.21
Sc 4½ ft. - ...	3.2	3.6	2.1	2.8	0.60
M 597 T 0 - 1½ ft. ...	3.2	3.4	3.2	3.6	0.54
Sa 1½ - 2½ ft. ...	2.7	3.2	3.4	5.4	0.48
Sb 2½ - 5 ft. ...	2.9	3.4	3.1	3.4	0.37
Sc 5 ft. - ...	3.7	4.0	3.1	3.8	0.13
M 598 T 0 - 2 ft. ...	4.0	7.0	3.8	—	0.06
Sa 2 - 4 ft. ...	3.1	3.8	2.9	4.8	0.43
Sb 4 - 4½ ft. ...	2.2	2.4	1.8	3.2	1.89
Sc 4½ - 6 ft. ...	2.2	2.4	1.7	2.4	0.26
M 599 T 0 - 2½ ft. ...	3.5	4.7	3.2	4.0	0.12
Sa 2½ - 4 ft. ...	2.6	2.8	2.6	2.6	0.89
Sb 4 - 5 ft. ...	2.2	2.4	1.6	2.5	5.17
Sc 5 - 6 ft. ...	2.9	3.0	2.0	2.7	3.58
M 600 T 0 - 1 ft. ...	3.4	3.8	3.0	3.6	0.08
Sa 1 - 2 ft. ...	3.5	3.6	3.4	3.8	0.12
Sb 2 - 3 ft. ...	2.8	3.2	2.7	2.8	0.51
Sc 3 - 4 ft. ...	2.5	2.4	1.4	2.2	3.86
Sd 4 - 5 ft. ...	3.4	3.8	1.7	2.4	3.26
Se 5 - 6 ft. ...	4.8	4.4	2.6	2.9	1.93
M 601 T 0 - 1 ft. ...	5.0	6.8	4.9	—	0.11
Sa 1 - 2 ft. ...	3.9	6.8	3.7	4.4	0.16
Sb 2 - 3 ft. ...	3.8	6.6	3.4	3.8	0.29
Sc 3 - 4 ft. ...	4.4	4.4	2.1	3.8	2.40
Sd 4 - 5 ft. ...	4.4	4.2	2.0	2.6	2.77
Se 5 - 6 ft. ...	4.6	4.4	2.3	3.0	0.90
Sf 6 - 7 ft. ...	5.4	4.6	2.4	2.4	1.71

Samples were taken from certain of these pits and the pH values determined on arrival at the laboratory (48 hours later). The soils were then spread out on glass plates and allowed to dry out at room temperature. At the end of a month the pH values were determined again. The results are given in Table III. These showed quite definitely that on drying out the acidity of the soil samples from below about 3 ft. rises rapidly.

Determinations of the sulphate content of the water extracts of the samples at the end of one month are also given in Table III which shows the very high concentration of sulphate ion present. A more detailed analysis of one water sample is given in Table IV which suggests that the sulphate ion is largely present in the form of aluminium sulphate.

Further samples were obtained from two fields and the change in acidity on drying out followed up at weekly intervals. Results are given in Table V. The analyses of the water extracts of these soils after ten weeks oxidation are given in Table VI.

It should be mentioned that the pH determinations of the soil suspensions were made by means of the quinhydrone electrode. Comparative readings of the quinhydrone electrode and the glass electrode on other soils indicate that the quinhydrone figures in general are liable to be between 0.2 and 0.6 pH more acidic.

A study of these results shows quite clearly that oxidation of organic coastal clays, consequent upon aeration, leads to the formation of sulphuric acid and sulphates in high concentrations. It would seem likely that such extreme acidity would be toxic to growing plants. Moreover the large amount of aluminium brought into solution raises the probability of aluminium toxicity.

Table IV.

Analysis of Water Extract of Soil Sample Seven Weeks after Drying Out.

per cent.

Sample	Fe_2O_3	Al_2O_3	CaO	MgO	K_2O	SO_4
M 599 Sb ...	0.04	2.46	0.06	0.06	0.003	4.49

After opening up these clays, therefore, it would seem desirable to remove such compounds from the soil as soon as possible, and the most feasible method should be to wash them out by water movement. Although it seems strange that water movement can take place at all in these heavy clays, it does in fact occur (1) and sub-soil irrigation, therefore, as practised by certain coconut estates, has much to recommend it. It is likely, however, that this method will occasion the loss of a certain amount of potash in the form of soluble potassium sulphate.

Table V.
Alteration in pH Values of Soil Suspensions on Drying Out.

Sample	Date, 1939.							
	11th Oct.	18th Oct.	25th Oct.	1st Nov.	8th Nov.	17th Nov.	22nd Nov.	22nd Dec.
M 612 T 0 - 18 ins. ...	3.6	3.8	3.7	3.6	3.6	3.7	3.7	3.7
18 - 30 ins. ...	2.5	2.0	2.0	2.0	2.0	2.0	2.1	2.0
30 - 48 ins. ...	2.8	2.3	2.0	1.8	1.7	1.6	1.6	1.7
48 - 72 ins. ...	2.9	2.2	2.2	2.0	1.9	1.8	1.8	2.0
M 613 T 0 - 12 ins. ...	3.5	3.4	3.5	3.4	3.5	3.5	3.5	3.4
12 - 24 ins. ...	2.5	2.7	2.5	2.5	2.5	2.5	2.6	2.5
24 - 36 ins. ...	2.8	2.1	1.8	1.6	1.8	1.8	1.8	1.8
36 - 48 ins. ...	3.6	2.7	2.4	2.1	2.2	2.1	2.2	2.2
48 - 60 ins. ...	4.2	3.0	2.4	2.4	2.4	2.3	2.3	2.3
60 - 72 ins. ...	4.5	3.2	2.8	2.5	2.4	2.2	2.3	2.4
72 - 84 ins. ...	4.5	3.6	3.2	2.8	2.7	2.6	2.6	2.5

Table VI.

Analyses of Water Extracts of Soil Samples after Drying Out for Ten Weeks.

Sample	Fe_2O_3 and Al_2O_3	CaO	MgO	K_2O	SO_4
M 612 T 0 - 18 ins. ...	0.10	0.02	0.05	0.002	0.54
Sa 18 - 30 ins. ...	0.64	0.03	0.01	0.002	1.48
Sb 30 - 48 ins. ...	1.65	0.04	0.04	0.002	4.06
Sc 48 - 72 ins. ...	1.61	0.03	0.07	0.001	3.06
M 613 T 0 - 12 ins. ...	0.14	0.04	0.03	0.002	0.51
Sa 12 - 24 ins. ...	0.12	0.02	0.08	0.003	1.53
Sb 24 - 36 ins. ...	1.16	0.04	0.25	0.001	3.50
Sc 36 - 48 ins. ...	0.90	0.06	0.18	0.001	3.14
Sd 48 - 60 ins. ...	0.67	0.08	0.27	0.002	2.16
Se 60 - 72 ins. ...	0.82	0.10	0.46	0.003	1.80
Sf 72 - 84 ins. ...	0.41	0.08	0.42	0.004	1.70

* Owing to an error no separate determination of Al_2O_3 was made.

To the neutralization of this high acidity may be attributed the good results obtained by the application of lime on certain coconut estates on this type of soil; that the effect is not due in these cases to the calcium ion is proved by the negative results obtained with dressings of nitro chalk, a neutral calcium salt.

References.

1. Belgrave, W. N. C. Coconuts on Heavy Soils. *Malayan Agricultural Journal*, Vol. XIX, No. 6, June, 1931, page 277.
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THE OUTLOOK FOR DERRIS

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Introductory.

The following article has been prepared in view of the world-wide interest now being taken in insecticidal materials of vegetable origin with the object of replacing arsenical preparations. Vegetable insecticides have the advantage over arsenical preparations in that when the latter are used to control insects on crops used directly for human consumption special precautions must be taken to eliminate the possibility of any residual toxic effect.

From the Malayan point of view, the two most important plant insecticides are derris and cube. For years past there has been a considerable trade in derris, while cube is the South American product which has a similar range of insecticidal usefulness and is proving a strong competitor of derris, especially in the United States of America (1). Cube (pronounced koobay) is the trade term applied to roots of various species of the genus Lonchocarpus, which is found widely distributed in the tropical parts of South America. It may be of interest to record that while cube is the trade term, the root is known by various other names, for example, "timbo" in Brazil, "barbasco" in Peru and "haiari" in British Guiana.

Trade in Derris.

There was a marked increase in Malayan exports of derris for 1939 compared with the two previous years as the figures in Table I show.

Table I.
Malayan Trade in Derris 1937-1939.

Year	Imports		Exports		Net Exports	
	Quantity	Value	Quantity	Value	Quantity	Value
	cwts.	$	cwts.	$	cwts	$
1937 ...	1,046	17,942	12,499	401,914	11,453	383,972
1938 ...	1,764	31,988	15,285	338,789	13,521	306,801
1939 ...	2,006	38,107	29,129	530,502	27,123	492,385

(Note. $1 = 2s. 4d.)

The above figures show that the net exports for the past year were slightly more than double those for 1938, figures for 1937 and 1938 being of the same order.

With regard to imports, 1,171 cwts. were imported from Sumatra in 1938, the amount rising to 1,950 cwts. for 1939.

Table II shows the distribution of the principal countries of import for the past three years.

Table II.
Distribution of Malayan Exports of Derris 1937-1939.

Country of Import	1937		1938		1939	
	Quantity	Value	Quantity	Value	Quantity	Value
	cwts.	$	cwts.	$	cwts.	$
United Kingdom ...	5,440	167,241	3,768	92,667	4,552	86,738
United States of America ...	3,064	91,824	6,445	118,708	18,256	311,458
Japan ...	2,426	96,684	3,745	101,062	4,118	97,253
Germany ...	713	22,707	211	5,377	353	6,509
Netherlands ...	252	10,310	161	5,332	291	4,252
Thailand ...	195	957	115	1,889	393	9,032
Hongkong ...	115	2,191	178	2,243	421	5,423
Other Countries ...	294	9,500	662	11,511	745	9,837
Total ...	12,499	401,914	15,285	338,789	29,129	530,502

Note. The above table does not take into account re-exports from importing countries.

The marked feature of the above figures is the increase in the exports to the United States of America; thus the amount exported in 1939 represents a three-fold increase on that shipped in 1938. The steady increase in the amount exported to Japan is also worthy of note.

Price of Derris.

The rotenone content of the root is still regarded as the criterion of insecticidal value, the ether extract being considered of somewhat secondary importance. Root which is sold on a rotenone basis commands, therefore, a much higher price than that offered on an ether extract basis. In the case of rotenone the usual basis on which contracts are effected is 5 per cent. for the root as delivered; with ether extract a standard figure of 18 per cent. is usually demanded. A small premium is sometimes given in the case of roots in which standard figures are exceeded; on the other hand a deduction is always made if the material is below standard.

Table III shows the average monthly Singapore prices prevailing in 1939 for both kinds of root. The figures are based on those quoted in this Journal for the appropriate months.

Table III.
Average Singapore Monthly Prices of Derris in 1939.

(Malayan dollars per picul.*)

Month	Rotenone Basis	Ether Extract Basis
	$	$
January ...	18.00	9.00
February ...	19.00	9.00
March ...	18.50	9.00
April ...	18.25	8.25
May ...	18.00	8.25
June ...	18.00	8.25
July ...	18.00	8.25
August ...	17.00	7.88
September ...	19.00	9.50
October ...	21.00	9.50
November ...	23.00	10.50
December ...	24.00	11.50
Maximum ...	24.00	11.50
Minimum ...	17.00	7.88
Average ...	19.31	9.07

* 1 picul = 133⅓ lbs.

The above figures show that the average price offered for root sold on a rotenone basis is rather more than double that for root which can be offered only on an ether extract basis. The latter type applies to the root grown in the Kinta District of Perak which is known as *Derris malaccensis*, Kinta type, and which formerly constituted such a large proportion of the total amount of derris exported from Malaya.

Derris and Cube in the United States of America.

The strong competition existing in the United States of America between derris and cube arose from the fact that the latter insecticide was offered at a lower price than derris of the same rotenone content. Cube was, therefore, the more economical insecticide to use and the price of derris declined in consequence.

For a few years past the exact position of cube in the insecticide market in the United States of America has been rendered somewhat obscure owing to the existence of the Dennis patent and the liability of payment of royalties.

In 1927 a grant of exclusive privileges was issued to Mr. W. J. Dennis in respect of the use of ground cube root with the fibrous element removed as an insecticide and vermifuge. The admissibility of the patent on certain technical grounds was challenged by some of the insecticide manufacturers and prolonged litigation has ensued.

When the case originally came up for hearing before the State Court the decision was given in favour of the patent, which had the effect of slightly advancing the selling price of cube by the amount of royalty demanded by the patentees. During 1938 and 1939 derris was practically on a parity with the royalty-paid cube, and consumption of derris tended to increase. The reason for the preference of derris over cube on the same price basis is due to a belief widely held by the American farmer that the ether extractives other than rotenone in derris are considerably more toxic or more repellant than those in cube. Insecticide manufacturers admit that at present there is no scientific evidence to support this statement and it may well be merely the dislike of a change from the older established derris to the more recently developed cube which is the foundation for this belief.

In June 1939 the Court of Appeal reversed the decision of the State Court in regard to the Dennis patent and, although the grantees of the original patent applied to the Supreme Court for a final hearing, that Court declined to review the decision of the Court of Appeal. The Dennis patent may therefore be considered as a dead letter and in the United States of America derris and cube compete as free products.

Consumption of derris and cube in the United States of America has increased considerably in the past three years and statistics show that in 1939 a considerable proportion of the increase can be ascribed to derris. Previous reference has been made to the increased trade in derris between Malaya and the United States of America during this period.

Table IV shows the approximate figures for imports of derris and cube into the United States of America for the past three years.

Table IV.

Approximate Imports of Derris and Cube into the United States of America 1937-1939.

Year	Derris	Cube	Total Imports	Proportion of Derris to Total Imports
	lbs.	lbs.	lbs.	per cent.
1937 ...	570,000	1,800,000	2,370,000	24
1938 ...	750,000	2,325,000	3,075,000	24
1939 ... (estimated)	2,000,000	2,700,000	4,700,000	43

The above figures confirm those given in Table II as regards the marked increase in imports of derris into the United States of America during the past year, while they also show that during the same period the proportion of derris imported to the total of derris and cube imported rose from 24 to 43 per cent.

As indicated previously the marked increase in the consumption of derris is due in no small measure to the uncertainty engendered as a result of the litigation in respect of the validity of the Dennis patent.

Future Prospects in the United States of America.

The future trend of events is, however, difficult to foresee. When war broke out last September stocks of derris and cube were at a low level. In normal circumstances this was only to be expected, since at this time of the year the heavy consuming season is over and importers are busy planning for the following year.

Reference to Table III shows that during the last quarter of the year there was a steady advance in the prices of derris. This can be ascribed to the war, holders of commodities generally expecting an appreciation of prices under such circumstances, while the depreciation in value of the Malayan dollar in relation to the United States dollar must not be overlooked.

The general opinion is held that prices did not advance unduly and there are now ample supplies of both commodities coming forward at prices which are slightly below the high figure reached in December last.

With regard to cube there seems little doubt that following upon the decision of the Supreme Court in regard to the Dennis patent suppliers in South America are certain to attempt to increase production, bearing in mind that South American countries are always anxious to increase shipments of raw materials to the United States of America in order to offset their adverse trade balances.

To sum up, therefore, while consumption of derris and cube is likely to be maintained and may show an increase on the present figures no increase in the price of Malayan derris can be expected in the near future in view of the likelihood of an increased production in cube consequent upon the revocation of the Dennis patent and the more favourable situation of South America compared with Malaya in regard to shipment to the eastern seaboard of the United States of America under present conditions.

Sampling of Derris.

American importers frequently complain of the variation in quality of Malayan derris. For example, consignments of root guaranteed to contain a minimum of say 6 per cent. rotenone are found to be deficient when examined on arrival, although samples have been drawn and analysed before shipment. The differences in rotenone content are too large to be ascribed to slight variations in analytical methods and can only be accounted for by unsatisfactory sampling.

The importance of accurate sampling of commercial consignments of root cannot be too strongly emphasized in view of the results of recent work carried out in the Chemical Division of this Department showing the possibilities of comparatively wide variations between the toxic contents, rotenone and/or ether extract, of the roots of individual plants propagated as stem cuttings from a single parent plant. These variations apply to all species of derris.

It must also be remembered that the bulk of the derris offered for sale in Malaya is grown by small-holders to whom rotenone is a comparatively recent introduction as a factor of importance in disposing of a crop. It is only in recent years that the various species of derris have been classified according to rotenone content and it is more than likely that mixed strains are still being propagated, with the result that average quality of root varies from generation to generation. The existence of this additional possibility of variation in quality of root due to a mixture of two or more species of derris being cultivated renders it still more imperative to ensure a satisfactory system of sampling the root before shipment.

When planting fresh areas all cultivators are urged, therefore, to purchase only proven material or to satisfy themselves that their own material is both uniform and satisfactory in quality. Cultivators need have no fear that the plants will deteriorate in quality as a result of continuous vegetative propagation; the research work of this Department has shown that with proven material the average quality remains constant from generation to generation.

With regard to sampling it is useless to draw a few roots at random from a small proportion of the bales forming a large consignment and to expect the sample to be representative. Exporters must remember that errors in sampling cannot be rectified in a chemical laboratory and it is therefore in their own interests to ensure preliminary satisfactory sampling before shipment. In this connexion it may be mentioned that the small range of variation found in the quality of cube root imported into the United States of America from South America weighs considerably with the American insecticide manufacturers. South American exporters of cube root have paid particular attention to the question of maintaining a uniform product and the Malayan exporter of derris should realize that it is in his own interests to follow that example.

Methods of Sampling.

Although perhaps a description of methods of sampling does not properly come within the scope of this article the subject is considered of such importance as to justify its inclusion.

Derris is usually shipped in bales measuring 42 ins. x 30 ins. x 28 ins., each bale containing from 175 to 240 lbs. of root; the amount in a bale depends on the state of division of the root. If whole root is shipped the amount in a bale will be of the order of 175 lbs., but if the root is first chopped into short lengths, of 4 to 6 ins., or whole lengths of root are folded into small bundles, the amount in a bale can be easily raised to the higher figure.

Since it is in the exporter's own interest to ensure that his material is accurately sampled a representative bulk sample of every consignment shipped should be accumulated irrespective of any sample that may have to be taken according to the terms of the contract. The bulk sample is made up by drawing a number of small samples, one from each bale as the press is being filled. When the requisite number of bales has been packed the bulk sample is mixed and quartered until about 1 lb. remains. This quantity should be reserved for analysis.

It is suggested that about 2 lbs. be drawn as a sample from each individual bale. If this amount of root is drawn from the first bale it must be maintained throughout the whole of the consignment; in other words with 100 bales the amount of the bulk sample will be 200 lbs. of which 199 lbs. will be returnable after sampling for inclusion in another consignment, only 1 lb. being eventually reserved for analysis.

The method of drawing the individual samples from each bale will vary with the state of division of the material and the following suggestions are made.

If whole root is being shipped, small pieces, 4 to 6 ins. long, should be cut from individual roots selected at random from the loads of the labourers engaged in filling the press until the required amount of 2 lbs. has been collected. Care should be taken to cut the short lengths from different parts of the individual whole roots.

In the case of chopped root, the procedure is simplified owing to the relatively small state of division of the material. A few pieces can be selected at random from the loads of the individual labourers throughout the filling of the press until the required amount has been collected.

If small bundles are being packed a sufficient number must be selected at random from each bale to ensure that when cross-sections of the bundles, say 6 ins. long, are removed by chopping, some from the middle of the bundles and some from either end, there is sufficient material for the individual sample. The remainder of each small bundle may be baled.

Experience has shown that by following the above procedure, which should ensure a representative sample, disputes between buyer and seller as regards quality of root based on analytical results are reduced to a minimum.

On no account should exporters filling a contract for root having a medium rotenone content attempt to mix *Derris elliptica*, Changi type, root of high rotenone content, with *D. malaccensis*, Kinta type, with its very low rotenone content, unless the rotenone contents of both types of root are known accurately, the proportions in which the roots should be mixed determined and the root shipped as chopped root after thorough mixing before baling. It has been suggested by more than one American importer of derris root that not a few of the complaints of variation in quality have arisen through unsatisfactory mixing of two grades of root widely different in respect of rotenone content. More than one Singapore exporter

of derris root has advocated the prohibition of further planting of *D. malaccensis*, Kinta type, with the object of raising the standard of the Malayan product and putting an end to the possibility of deliberate dilution by unscrupulous dealers of a high grade root with a low grade root.

Observations on Derris in Malaya.

Although derris grows satisfactorily on a fairly wide range of soils it is preferably planted on those of a friable nature, such as the lighter coastal alluvial soils and shallow peat. Such soils allow of ample root development, while harvesting is facilitated. Inland gravelly soils and those containing a high proportion of clay are unsuitable.

At present prices it is extremely doubtful whether the cultivation of derris under estate conditions would be an economic proposition, unless strains of particularly high yielding root capacity can be evolved. *D. elliptica*, Sarawak creeping, may have possibilities in this respect(2).

Derris is, however, a short duration crop and lends itself readily as a catch-crop during the early stages of establishing a main crop; for example, it is at present being cultivated on a few estates as a catch-crop with young rubber. When planted as a catch-crop care must be taken not to plant derris too close to the permanent crop, thereby preventing, as far as possible, root disturbance of the latter when harvesting the root.

As regards the present requirements of the market a medium grade root, say rotenone 6 per cent., ether extract 20 per cent., is still preferred to a high quality root such as *D. elliptica*, Changi No. 3, containing rotenone 11 per cent. and ether extract 25 per cent. for the reasons given in a previous article in this Journal(1). As stated in that article, a demand for high quality root at a price commensurate with its superior rotenone content is only likely to arise in the event of the successful stabilization of rotenone on exposure to air being accomplished and the consequent employment of oil emulsions and impregnated dusts for insecticidal purposes in preference to the use of dusts for which the medium grade root diluted with an inert filler is more suitable.

As indicated previously, *D. elliptica*, Sarawak creeping, would appear to be the most satisfactory type to plant at present. Our experiments have shown that it has a good root-yielding capacity, while its average toxic content of about 6 per cent. rotenone and 21 per cent. ether extract makes it acceptable to the market.

It will be appreciated, therefore, that in view of the low price now prevailing for the root and the future uncertain state of the market derris cultivation is not being widely advocated in Malaya. Further, legislation has recently been enacted to include derris among those plants of which living material may only be exported under licence; at present, applications, which are practically entirely for planting material rich in rotenone, are being refused. While it is not intended to refuse all applications for licensed planting material as a matter of course there are special circumstances in the case of derris. As mentioned previously, the market for the dried root is strictly limited, especially for high grade material, and the present

price is low. It is felt, therefore, that large supplies of root coming on the market from other sources might well cause a further collapse of the price, in which case Malaya would lose all benefits accruing from years of research work resulting in the isolation of proved strains of high quality planting material which it is hoped will profoundly affect the utilization of derris as a vegetable insecticide in the future.

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Received for publication, 4th May, 1940.

CONDITIONS ON RUBBER SMALL HOLDINGS IN MALAYA.

2nd Quarter, 1940.

Prepared by the Economics Branch of the Department of Agriculture, S.S. and F.M.S., in collaboration with the Field Branch of the Department.

Rainfall.

In general the quarter was drier than normal, though in many areas April and May rainfall approximated to average, notably in some districts of Pahang, Perak and Johore. June was an exceptionally dry month.

Prices.

Tables I and II summarize prices paid during the quarter for small-holding rubber.

There was considerable variation in the prices paid for coupons. In Penang and Province Wellesley coupons were sold in April at only $12 per picul equivalent. Later in the quarter $20 was paid in Penang and $26 in Province Wellesley. In Batang Padang, Perak, coupons fell from $34.20 in mid-May to $25 at the end of that month, and were $26.50 at the end of June. In Lower Perak coupons rose from $27 to $33; similarly in Kedah they rose steadily from $28 to $34, while in Kelantan they were quoted at $24 to $24.50 during April and May, but fell to $20 in June.

Production and Tapping.

Production of rubber on small holdings was again higher during the quarter under review as will be seen on reference to Table III.

As indicated by the increased production the area of small holdings out of tapping was found to be substantially reduced when the quarterly survey was made at the end of the quarter. The results of this survey are summarized in Tables IV and V.

The dry weather experienced during the quarter permitted unrestricted tapping and the fact that adequate supplies of coagulants were available coupled with a higher price for uncouponed rubber in some localities encouraged small-holders to tap their holdings. Another factor contributing to increased tapping at the end of the quarter was the early issue of coupons for the 3rd quarter, which commenced on 17th June.

The Pahang report states that in Bentong some small and medium holdings have adopted alternate daily tapping and also that young budded stands have been brought into tapping from which the yield of latex is two or three times the yield from seedling rubber. A Perak report states that bark consumption on many holdings was heavy.

Table I.

Lowest and Highest Rubber Prices Paid by Local Rubber Dealers.

(In Malayan dollars per picul of 133 1/3 lbs.)

2nd Quarter, 1940.

Quality	Penang	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Kedah	Johore	Kelantan
				APRIL					
Smoked sheet	42.00-48.00	40.00-46.50	40.00-44.80	40.00-44.00	38.50-43.50	*	41.00-46.50	39.60-48.60	38.00-42.20
Unsmoked sheet	41.00-47.00	37.50-46.50	38.00-45.00	40.00-43.00	39.00-41.50		39.50-45.00	38.00-42.00	35.00-40.60
Scrap	28.00-34.50	30.00-33.00	33.00-35.00	—	—		31.00-34.50	31.50-38.70	26.50-30.00
				MAY					
Smoked sheet	44.00-49.00	41.50-48.00	40.05-48.45	42.00-48.50	40.00-47.60		42.00-50.00	40.00-47.50	37.50-43.50
Unsmoked sheet	43.00-48.00	39.60-48.00	38.50-46.00	40.00-47.00	39.00-46.20		40.50-48.50	39.00-46.50	34.40-40.50
Scrap	30.00-38.00	28.00-35.00	32.00-35.00	—	—		31.50-38.00	31.00-40.80	24.30-30.00
				JUNE					
Smoked sheet	44.00-47.00	40.00-48.00	42.00-48.00	41.00-48.00	40.00-47.80		41.30-49.00	40.00-47.00	39.00-44.15
Unsmoked sheet	41.00-48.00	38.00-48.00	41.00-46.00	40.00-46.00	36.00-44.80		40.00-47.50	38.00-45.00	35.20-41.00
Scrap	24.00-33.00	28.00-34.50	30.00-33.00	—	—		31.00-40.00	27.00-36.00	24.00-28.75

* Not available.

Table II.

Mean of Lowest and Highest Rubber Prices Paid by Local Dealers at a number of Centres in each State.

(In Malayan dollars per picul of 133 1/3 lbs.)

2nd Quarter, 1940.

Quality	Penang	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Kedah	Johore	Kelantan
				APRIL					
Smoked sheet	42.50-45.75	41.49-43.70	41.63-42.67	40.90-43.30	40.93-42.77	*	41.88-43.28	40.65-42.92	39.50-41.10
Unsmoked sheet	42.00-44.25	41.27-42.09	40.12-41.82	40.30-41.70	40.00-41.38		40.00-41.78	38.61-41.13	37.25-39.55
Scrap	31.00-32.75	30.00-33.00	33.00-35.00	—	—		31.75-32.50	33.04-35.24	27.60-30.00
				MAY					
Smoked sheet	46.25-48.00	42.64-46.32	42.84-46.16	42.50-47.25	41.47-45.85		42.70-47.05	41.75-45.35	39.50-42.35
Unsmoked sheet	43.75-47.00	40.99-44.45	40.67-45.00	41.20-44.70	40.30-44.35		40.90-46.50	40.56-44.04	35.45-39.35
Scrap	33.50-36.00	28.00-35.00	32.00-35.00	—	—		32.00-36.33	32.51-36.26	26.15-29.50
				JUNE					
Smoked sheet	44.50-46.50	42.83-46.05	43.67-45.60	42.40-46.32	41.98-46.12		42.60-45.30	41.56-44.61	40.50-42.58
Unsmoked sheet	42.50-45.88	40.74-44.04	41.17-44.30	40.90-44.30	40.12-43.70		40.83-43.05	40.24-43.16	36.10-39.25
Scrap	27.00-29.50	28.00-34.50	30.00-33.00	—	—		31.50-34.83	29.75-32.63	25.00-27.38

* Not available.

Table III.
Production of Rubber on Small Holdings.
(in tons)

	Total First Half-year 1939	1st Quarter 1940	2nd Quarter 1940	Total First Half-year 1940
Federated Malay States ...	20,604	22,637	28,553	51,190
Straits Settlements	4,177	3,781	3,931	7,712
Unfederated Malay States ...	22,012	21,973	26,881	48,854
TOTAL MALAYA ...	46,793	48,391	59,365	107,756

General Conditions on Holdings.

Reports indicate that small holdings continue to be maintained in reasonably good condition. In Krian, Perak, good progress has been made with the slashing of undergrowth and the construction of drains.

On Penang Hill clean-weeding is being given up largely owing to the provisions of the Hill Lands Ordinance.

In Pahang a comprehensive demonstration on measures to be employed against soil erosion, which included examples of terracing, trenching, platform planting and various covers, was staged on a Bentong holding and attended by 231 planters of all nationalities. Arising out of this demonstration 77 piculs of cover crop seed were purchased in Bentong through the Department. More attention to soil erosion is reported from all Circles in Pahang.

Planting.

The Pahang report states that quantities of high-quality budwood and budded stumps have been distributed through the Department during the quarter. Kemaman, just across the Trengganu border, has made enquiries for 28,000 budded stumps and 500 yards of budwood.

Replanting is not making much headway in Pahang, but in Kuantan over 100 acres have been replanted. There were enquiries for advice on manuring, and approximately 11 tons of approved R.R.I. mixture were obtained for use in the Kuantan Circle alone.

There is a good deal of interest in budding but there is also considerable ignorance on the subject among small-holders in Pahang, and Asiatic Rubber Instructors have directed much of their propaganda work to this subject. Budding classes were conducted in several centres and are popular.

Table IV.

Estimated Acreage of Tappable Rubber which was out of Tapping on Holdings of less than 100 Acres at the end of June, 1940.

PERAK				SELANGOR				NEGRI SEMBILAN				PAHANG			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage
Batang Padang	36,187	5,400	15	Klang	16,143	5,700	35	Seremban	23,639	17,500	74	Raub	10,534	5,600	53
Kinta	38,874	5,100	13	Kuala Langat	23,881	6,700	28	Tampin	21,896	8,500	39	Kuala Lipis	15,457	2,600	17
Kuala Kangsar	92,166	16,700	18	Ulu Langat	45,012	13,500	30	Kuala Pilah	31,832	14,600	46	Bentong	12,224	1,500	12
Upper Perak	15,590	3,700	24	Ulu Selangor	31,463	9,100	29	Jelebu	9,097	1,400	15	Other Districts†	40,373	11,600	25
Larut & Selama	43,132	6,500	15	Kuala Lumpur	20,277	6,700	33	Port Dickson	11,133	5,200	47				
Krian	9,408	7,600	81	Kuala Selangor†	8,417	2,500	30								
Lower Perak†	26,735	5,100	19												
Dindings	9,873	2,900	29												
	271,965	53,000	19		145,193	44,200	30		97,597	47,200	48		84,588	21,300	25

MALACCA				PENANG & P. WELLESLEY				SINGAPORE			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage
Central	14,093	‡	‡	North	3,549	800	22	Singapore	20,115	400	2
Alor Gajah	30,838	14,000	20	Central	10,785	5,400	50				
Jasin	25,286			South	8,936	400	4				
				Penang	15,822	500	3				
	70,217	14,000	20		39,092	7,100	18		20,115	400	2

JOHORE	350,007	38,500	11
KEDAH	102,126	11,200	11
KELANTAN	49,133	11,300	23
PERLIS	2,910		
TRENGGANU ‡	29,836	6,600	20

The percentage of areas out of tapping in March, 1940, was as follows:—Perak 23, Selangor 42, Negri Sembilan 56, Pahang 22, Malacca 29, Penang and Province Wellesley 21, Singapore 1, Johore 11, Kedah 26, Kelantan 35.

†Estimated from percentage for other Districts in the State.

‡Estimated from percentage for rest of Malaya.

Table V.
Comparisons of Areas of Rubber Small Holdings Out of Tapping.

	June, 1939		March, 1940		June, 1940	
	Acres	Per-centage	Acres	Per-centage	Acres	Per-centage
F.M.S ...	338,100	56.4	198,000	33	165,700	27.6
S.S. ...	49,800	38.5	29.200	22	21,500	16.6
U.M.S. ...	155,400	29.1	89,700	17	67,600	12.7
Malaya ...	543,300	43.0	316,900	25	254,800	20.2

Demonstrations of budding continued to be carried out at Agricultural Stations in Perak for the benefit of visiting parties of interested small-holders. In Sitiawan District budding on small holdings has successfully been carried out by a Chinese experienced budder the charge for each "take" being only 3 cents.

Some small-holders in Perak are reported to be hesitating to replant their rubber as they are afraid of their position should the restriction period not again be extended. Others who had decided to replant are putting it off.

In Negri Sembilan budwood has been supplied to two small-holders, and an increased demand is anticipated in September/October. Permits for replanting issued to small-holders during the quarter totalled 202 acres.

Budwood has also been supplied by Agricultural Stations in Johore, and an area of 65 acres was budgrafted in Johore Central Circle during the quarter. The same Circle report states that new planting which was delayed by lack of rain during the previous quarter has now been carried out under good conditions, and almost all new grants have been planted up.

Pests and Diseases.

Early in the quarter mild outbreaks of *Oidium Heveae* occurred in several districts in Johore North, but soon disappeared and their results were not serious.

Mouldy Rot was in evidence in those parts of the country which received much rainfall, but the dry weather of June completed control measures.

Root disease is common on riverside lots in Lower Perak subject to regular flooding, but in most cases nothing can be done until bunds are constructed.

In Negri Sembilan natural covers are now generally allowed to become established throughout small holdings, and the willingness of owners to carry out anti-soil erosion measures when replanting is doing much to improve conditions.

Rats have done considerable damage to new planted areas in a district of Perak South. The monetary loss was considerable as clonal seed was planted at stake. Wire protectors, poison baits, and packs of dogs are being used to control the rats. In Pahang giant snails, white ants, and sun-scorch were reported mostly affecting young rubber

General.

All reports draw attention to the increased use of sulphuric acid as a coagulant in spite of the fact that plentiful supplies of acetic acid are now available.

In the Pekan District of Pahang over 2,000 leaflets dealing with the production of a better class of sheet were distributed.

The "Devon" type smoke house which was being erected at Kalumpang, Selangor, and mentioned in the report for the previous quarter, was completed and is working satisfactorily.

The sale of latex in the Segamat District of Johore continues and is becoming increasingly popular. Towards the end of June competition among the various purchasing agents was keen and the price per kati (dry rubber content) rose to 20 cents. A Chinese agent functioning on similar lines commenced business in the Muar District. There was also a further extension of the selling of latex in the Johore Central Circle, four new agencies having opened in Batu Pahat and one in Kluang. In Pontian District in Johore South, on the other hand, the sale of latex is on the wane owing to dealers looking for too much profit.

Reviews.

The Coconut Industry.*

In the latter half of 1939 the Hon. Maximo M. Kalaw, a member of the National Assembly of the Philippine Islands, accompanied by his technical adviser Mr. Hilarion G. Henares, undertook a special mission abroad to investigate the methods of cultivation, treatment, and marketing of coconut products in coconut producing countries as well as the conditions affecting them in the principal markets of the world. His report is of special interest to those connected with the coconut industry in all countries in view of the very serious situation now developing within that industry.

After briefly summarizing the salient points and recommendations, the report is divided into seven parts which deal with the author's visit to the Netherlands Indies, Malaya, Ceylon, France, and the United States of America; a proposed Coconut Congress; the copra market in Europe; defibring, spinning, and weaving coir in France; the American market for copra and coconut oil; recommendations; and the effect on the coconut industry of independence. There are also seven appendices.

His recommendations are intended primarily to prepare the coconut industry in the Philippines to stand the shocks of political and economic separation from America. He urges that a National Coconut Corporation should be established immediately and that the following steps through that Corporation, or otherwise, should be taken:

1. The improvement of Philippine copra through Government standardization and the establishment of drying plants and coconut centrals.
2. The industrialization of coconut by-products such as the utilization of the husks and shells.
3. The elimination, as much as possible, of the middleman through the establishment of coconut co-operatives throughout the country, and the improvement of credit facilities to coconut planters.
4. The establishment of regular freight and shipping service to foreign countries.
5. The establishment of a Coconut Institute on a Government-owned plantation wherein a research and experimental station shall be established exclusively dedicated to the coconut idustry.
6. The fostering of greater home consumption of coconut products.

These recommendations are to be implemented principally by means of the establishment of small copra driers, large mechanical copra driers and big industrial units for producing finished manufactured products of all kinds from the coconut.

It is particularly interesting to note that the small drier specifically recommended is the Malayan type 15 drier, which is the model most favoured by small producers in Malaya.

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* *The Coconut Industry.* Report of Hon. Maximo M. Kalaw. Bureau of Printing. Manila (unpriced).

The procedure likely to be followed in the Philippines is that the small farmers in coconut regions will be invited to pledge themselves to dry all their copra in the approved copra driers or copra centrals built by Government and to market their copra through the Government so as to avoid the middleman. The growers would be carefully instructed how to use these kilns and would be given the option of buying the kilns by means of a system of easy payments.

New light is thrown on the importance of the coir industry at the present time. Evidence is submitted to show that coconut fibre is superior to all other fibres as a raw material for making sand-bags owing to its great resistance to rotting which is of particular importance because such bags have to be kept damp. Mr. Kalaw emphasizes that sand bags are required not only for the trenches but also in especially large quantities for the protection of public buildings.

In addition he relates that coir fibre has now many other important industrial uses which he describes and he urges that the production of coir and coir products should be one of the principal activities of the industrial centrals which he proposes.

It is estimated that the whole plan, covering the remaining six years of the Commonwealth before full independence is reached would cost the Philippine Government no less than P20,000,000 (Malayan $14,000,000). This is made up as follows:—

5,500 copra driers at P950 each	...	P5,225,000
20 provincial centrals at P82,600	...	1,652,000
5 national centrals at P695,000	...	3,475,000
Coconut institute for experimentation and research		648,000
Loans to planters	...	9,000,000
Total	...	P20,000,000

It has already been approved by the United States Congress that the proceeds of the excise or processing tax on copra and coconut oil entering the U.S.A. accumulated since 1934 which now amount to 200 million pesos, may be used for providing facilities for drying copra and for making loans to planters in the Philippines. It is therefore more than probable that the recommendations made in the report will be adopted.

Note.

The Philippine Coconut Industry.

(Statistics from Leo Schnurmacher Inc.)

Acreage under coconuts	...	1,589,000
Total number of palms	...	121,685,480
Palms in bearing	...	91,178,800
Total commercial production of copra (copra equivalents)	...	850,000 tons

F.C.C.

Wayside Trees of Malaya.

By E. J. H. Corner, M.A., F.L.S., *Assistant Director of Gardens, Straits Settlements. Government Printing Office, Singapore. In two volumes: Vol. I, 770 pp. and 259 text figures; Vol. II, 228 plates. Price (both volumes) $10 (Malayan).*

Most people have some slight interest in the trees they see about them. In many cases this interest would be quickened if there were always available a mentor to name the trees, draw attention to botanical characteristics, and deal authoritatively with all the numerous questions the average layman would wish to have answered.

Mr. Corner's book provides us with the ideal substitute for such a mentor and is a most valuable addition to the literature of Malaya's flora; with its aid the reader will be able gradually to develop a very complete knowledge of most of the trees he is normally likely to see in his travels in this country.

The limits set to the scope of this book are generous ones as there are descriptions of some 950 species. These are the common trees outside of the high forest, and Mr. Corner points out that there are at least 2,500 species of trees arranged in the forest at a rate of a hundred genera to an acre, making accurate description impossible except in hard scientific terms. The remarks which accompany the descriptions of the trees are limited to their biological aspect and only passing reference is made to their history, cultivation and economic uses in view of the fact that such aspects have already been dealt with exhaustively in Burkill's Dictionary.

Volume I is divided into four parts, and the first part, which consists of 53 pages, constitutes a most valuable introduction to the general subject of the book. A short section on the reason for, and construction of, botanical names will be welcomed by all those who do not understand, or who object to, their use because of failure to appreciate their usefulness. After a brief reference to the subject of Malay names for trees there follow an explanation of the arrangement of the specific descriptions, four methods to identify a tree, and a section explaining the use of keys as a means of identification.

The next section, Descriptive Terms, is a guide to the botanical structure of the tree and will prove of immense help and interest to the layman. It has numerous sub-sections: General Terms, Roots, Bark, Branches, Buds, Leaves, Leaf-shape, Leaf-arrangement, Leaf-variation, Flowers (flower-arrangements, forms of inflorescence, flower-structure, structure and position of the ovary), Fruit. This section has a large number of line-drawings amply illustrating the text.

Further sections of Part I are: General Remarks about Trees, The Shapes of Trees (including sub-sections on the arrangement of leaves), Pagoda-Trees and Terminalia-Branching, Ant-Trees, Buttresses, Flowering and Leafing, Malayan Vegetation, Trees of Local Interest (a list of particular trees to be found in the various States and Settlements, by town and locality), Books, Periodicals.

Part II consists entirely of Keys to the Identification of Families and Genera, and takes up 40 pages.

Part III, Descriptions of Families, Genera and Species, is the main portion of the book, and provides descriptions of some 950 species arranged in 392 genera and 76 families. The descriptions are profusely illustrated with excellent line-drawings. The main Family sections commence with a description of the family, giving the principal botanical characteristics, the number of species recorded in the world, and the number of genera and species found in Malaya. There then follow in sub-sections the descriptions of the genera with a key to the species in each genus, and full descriptions of all species. Derivations and meanings of all botanical names, family, genera and species, are given. Part III thus constitutes a most complete and exhaustive guide to the trees coming within the scope of the book.

Part IV consists of indices to English, Malay and botanical names and botanical and descriptive terms.

Volume II consists of plates only, of which there are 228, all from photographs of living material, either actual trees, or specimens of foliage, flowers and fruit. Most of the illustrations of trees give the locality of the particular tree photographed. All the plates are excellent reproductions and form a fitting appendix to the main volume. A reference to each plate is made under the description of the tree in Volume I but an additional list of plates would have been a convenience.

Mr. Corner is to be congratulated on a most excellent production. We understand that the book has taken most of his spare time over several years in addition to much official time, but he has the satisfaction of knowing that he has achieved his object: "To write a book about Malaya for all who find beauty and inspiration in the life of the country....."

H.L.B.

Notes and Comments.

CANNED PINEAPPLE MARKET IN THE UNITED KINGDOM.

The Malayan canned pineapple industry is facing difficulties due to the fact that the Ministry of Food has now taken complete control of the imports into the United Kingdom of all foodstuffs and is not purchasing further supplies of canned pineapple for the time being.

This action has debarred the local industry from its principal customer—the United Kingdom—and the result is likely to be an accumulation of unsold stocks in Malaya, or a drastic curtailment of further canning.

After negotiations, delivery to fill contracts already made was permitted, but there is at present no immediate prospect of selling further quantities to the United Kingdom.

Negotiations are, however, proceeding with the Ministry and it is hoped that such arrangements for sales to the Ministry will be effected as to ensure the continuance of the packing industry in this country.

Consequent upon the loss of the United Kingdom market the Central Board of Pineapple Packers decided that packing should cease after a stock of 450,000 cases had been accumulated, this quota being allotted to members in proportion to shares held in the Association.

The pack for this season was originally fixed at 1,400,000 cases. Including the 450,000 mentioned it will actually amount to about 985,000 cases.

In spite of the fact that the season's pack was some 415,000 cases short of the fixed quota, the greater part of this deficit was due to the strikes earlier in the season rather than to the action taken by the Board to cease packing when stocks reached 450,000 cases. Only a comparatively small proportion of the deficit actually represented wasted fruit, so that the loss to growers will not be as great as originally anticipated.

The burden of the loss of the United Kingdom market will be felt, in particular, in future seasons, and it is to be hoped that the present negotiations may be successful in re-opening the United Kingdom as a market for Malayan supplies.

MALAYAN CANNED PINEAPPLE SHIPMENTS TO CANADA.

The Canadian Government has prohibited the import of Standard grade Malayan canned pineapples, and in future only Golden grade may be shipped to that country.

This restriction follows the action of the Minister of Food in the United Kingdom in restricting imports of Canadian canned fruits into the United Kingdom. The Canadian Government states that the import of the cheaper grades of canned pineapples would make it impossible for the surplus production of Canadian canned fruits to be absorbed in the domestic market, and with the total exclusion of canned fruits from the United Kingdom market surplus production from future crops will be very large.

The decision is a serious blow to the Malayan industry as shipments of Standard grade to Canada during recent years have been approximately 11 per cent. of total Malayan exports.

ECONOMY MASHES FOR POULTRY.

In Poultry Leaflet No. 1. "The Feeding of Poultry" recommendations are given of mashes which have proved very satisfactory, but as a result of the war it has now become difficult or impossible to obtain the following constituents—dried skim milk, whale meat meal and yeast—with the result that these standard formulæ can no longer be recommended to the public.

In anticipation of the shortage that has now become a fact, work was commenced several months ago by the Department of Agriculture with a view to evolving substitute mashes which, while made up of constituents which it is hoped will continue to be available locally, can still be considered as reasonably adequate from the standpoint of growth and production. To test such substitutes as have been devised in a manner that leaves one positive of their value is a long-range project under local conditions, and it is thus not yet possible to offer any fully-tested formulæ to the public. In view, however, of the increasing interest in poultry keeping that has recently become apparent, it has been decided to publish at this stage the formulæ of two economy mashes that have given reasonable results up to date, and to suggest simple modifications of these which the future may show to be advantageous.

	Chick Mash.	Growers Mash.	Layers Mash.
Broken rice, ground* ...	36	—	same as chick mash
White cargo bran ...	21	23	
Groundnut cake ...	36	10	
Copra cake ...	—	60	
Steamed bone flour ...	3	3	
Salt	1	1	
Powdered limestone ...	1	1	
Red palm oil ...	2	2	
	100	100	

Modifications suggested for trial are as follows:

Chick Mash—

(*a*) Reduce the rice and groundnut cake by 6 parts each and substitute by 12 parts of green gram;

or (*b*) Reduce the groundnut cake by 6 parts and substitute either by 6 parts of blood meal (the fertilizer) or by 6 parts of soya bean curd.

* Undermilled broken, white broken, or parboiled broken rices may be used interchangeably, though the first is probably to be preferred.

Growers Mash—

(*a*) Reduce the copra cake by 10 parts and substitute by 10 parts of green gram.

The mashes suggested above are to be mixed and used as in the case of those shown on page 2 of the leaflet, other details, *e.g.*, the feeding of evening grain, being identical. Those whose interest is confined to a small flock only, however, are recommended to study the free-range methods advocated on page 4 of the leaflet, as a "household scrap" basis of feeding is particularly valuable during an emergency such as the present.

FERTILIZER PRICES, AUGUST, 1940.

The following are the prices current for the month of August, 1940, of some of the more important fertilizers.

Product.	Analysis				Price per ton $
	Nitrogen (N)	Phosphoric Acid (P_2O_5)		Potash (K_2O)	
		Soluble	Insoluble		
Sulphate of Ammonia ...	20.6	—	—	—	114.00
Calcium Cyanamide ...	20.6	—	—	—	120.00
Muriate of Potash ...	—	—	—	60	150.00
Sulphate of Potash ...	—	—	—	48	not available
Superphosphate (concentrated) ...	—	39	—	—	140.00
Superphosphate ...	—	16-18	—	—	75.00
Basic Slag ...	—	16*	—	—	75.00
Rock Phosphate (Christmas Island) ...	—	11*	38‡	—	37.00 ¶
Rock Phosphate (very finely ground Gafsa) ...	—	11*	26 - 28‡	—	40.00
Lime ...	—	—	—	—	20.00

* Citric soluble. ‡ Total ¶ $35.00 per ton *ex* warehouse, Singapore.

Quotations are *ex* warehouse, Port Swettenham, Klang, Singapore and Penang, with the exception of muriate of potash which is *ex* warehouse, Port Swettenham, Klang and Singapore.

Departmental.

FROM THE DISTRICTS.

Compiled in the Office of the Chief Field Officer from Monthly Reports of Agricultural Officers.

July, 1940.

The Weather.

July was an abnormally dry month throughout the Peninsula but rain was general during the last few days of the month.

Crop Reports.

Rubber.—There was a slight fall in the maximum price quoted for smoked sheet, the range during the month being $42 to $45 per picul. The general range for uncouponed rubber was $15 to $18 per picul, though in Johore South it was quoted from $14 to $25.50. Coupon values varied considerably; in Kedah they fell from $33 at the beginning of the month to $23 at the close. In Pahang they were sold at $25, in Negri Sembilan from $24 to $27, and in Johore from $18 to $24.

On newly-planted areas difficulty has been experienced in growing cover crops owing to the dry weather, and resowing has been necessary in many cases.

The purchase of latex in the Pontain District of Johore has now ceased entirely.

In Kelantan Chinese owners of new plantings are reported to be using groundnuts and other legumes as catch-crops. In the same State the total number of smoke-houses constructed under the supervision of the Asiatic Rubber Instructors is now 103 completed, 23 under construction, and 42 projected.

Padi.—Normal padi operations have been considerably upset by the extremely dry weather experienced during recent months. In many localities nurseries have suffered severely, and land has not been ready for transplanting. On the other hand, transplanting has proceeded with success in other localities and the rain at the close of July helped considerably to improve conditions.

In Stage IV of the Sungei Manik Irrigation Scheme more than 7,000 acres have been felled and partly burnt and colonists will be able to enter their lots and plant crops such as maize, dry padi and tapioca at once.

In Brunei the new and more favourable terms for Temporary Occupation Licences for padi land announced during June, and the special terms, including the payment of a daily wage of 50 cents, for Brunei Malays who wish to take up wet padi in special settlement areas, were given wide publicity during the month. There were 36 new applications for wet padi land in the State during the month.

Vegetables.—The British Resident, Perak, has approved the free initial distribution of local vegetable seeds to police personnel and other Government officers in order to encourage local production. Supplies of seed were obtained and distributed as required from the State Agricultural Office. Vegetable seeds were also sold to the public at 10 cents per packet.

Vegetable crops in the Kinta District of Perak have been growing well, but owing to the dry weather much labour has had to be expended on watering. At Sungei Guriang, Tapah Road, about 220 acres of land have been given out on T.O.L. to Chinese for vegetable growing. In this same locality 10 acres have been planted with food crops.

At Batu Gajah a commencement has been made with the cultivation of vegetables on selected plots of land in the Sanitary Board area. Fifteen Government servants have taken up about 1 acre of land and are cultivating it co-operatively. An area of 15 acres in Ipoh, intended as a building site, will be used by Government servants living in that part of the town for the cultivation of vegetables. Other areas have also been set aside for the same purpose in other parts of the town for non-Government servants.

Food Crops.—The cultivation of food crops is increasing in Selangor and approximately 143 acres have been planted with maize in the Kuala Selangor District.

In Brunei wide publicity was given during the month to Government's desire that the planting of foodstuffs should be considerably increased and by the end of the month there were indications that the announcement of the specially reduced T.O.L. fees for food-crops land was having a marked effect.

Manila Hemp.—The Central Agricultural Station, Johore, has supplied 2,000 suckers to an estate for nursery planting, but unfortunately it is feared that with the dry weather a considerable number have died.

Fruit.—In Johore Central a large crop of Nyior No. 1 orange is reported to be ripening. An orchard of 8 acres has been opened up in this Circle and has been planted with bananas, rambutans and durians on the lines of the Central Agricultural Station.

Poultry.—A poultry farm of 8 acres has been commenced in Johore Central, the intention being to cross R.I.R. with *kampong* fowls.

Sago.—The Government of Brunei has introduced restriction of the exports of crude sago flour as there is evidence to show that the large increase in exports which has obtained for some time was depleting the sago reserves of the State. Eighteen applications for land for the planting of sago were made in the Kuala Belait District during the month.

Ploughing Demonstrations.—A Kelantan ploughman, sent by the State Agricultural Officer, Kelantan, gave a demonstration of ploughing at the Chenor Padi Test Station, Pahang South, to all Malay Agricultural Assistants and Subordinates. A further demonstration was given at Kampong Tanjong Lalang and was attended by 50 people, most of whom tried ploughing by the methods demonstrated.

Statistical.

MARKET PRICES.

July 1940.

Major Crops.

Rubber.—The Singapore market was relatively stable during July, the price of No. 1 X. Ribbed Smoked Sheet fluctuating between 36¼ and 37 cents per lb. after rising to 37¼ cents at the beginning of the month. The average of daily quotations for the month was 36.77 cents per lb. as compared with 37.34 cents in June. The London average price was 12.41 pence per lb. and New York 21.03 cents gold as compared with 13 pence and 21.81 cents gold in June.

Prices paid for small-holders' rubber at three centres during the month are given in Table 1.

Table I.

Weekly Prices Paid by Local Dealers for Small-Holders' Rubber, July, 1940.

(Dollars per picul of 133 1/3 lbs.)

Grades	Kuala Kangsar, Perak					Kuala Pilah, Negri Sembilan				Batu Pahat, Johore.				
	3	10	17	24	31	4	11	18	25	3	10	17	24	31
Smoked Sheet ...	39.53	44.15	43.04	43.00	43.66	43.50	43.00	43.50	43.00	41.40	41.00	40.29	40.00	40.80
Unsmoked Sheet ...	40.00	41.19	39.00	—	—	42.00	41.00	—	—	—	38.11	36.49	39.50	38.80
Scrap ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Transport by F.M.S.R. lorry service Kuala Pilah to Seremban 12 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8 per ton.

Transport from Batu Pahat to Singapore by lorry, excluding duty, 90 cents per picul.

Transport from Kuala Kangsar to Prai by railway $6.20 per ton.

At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.

Palm Oil.—A letter from the Malayan Information Agency dated the 5th June states that there has been no business for some little time in Malayan palm oil, and that the last price paid was £17 per ton.

Local sales of palm oil in sellers' drums were made during July at $185 per ton f.o.b. Port Swettenham for unbleached oil 5 per cent. f.f.a.

Copra.—There was a further fall in the Singapore market during July. The sun-dried grade was quoted at $2.90 per picul for the first half of the month and fell to $2.75 in the second half, averaging $2.83 per picul as compared with $3.17 in June. The mixed grade averaged $2.56 as compared with $2.80 in June.

A letter from the Malayan Information Agency dated the 5th June states, on information from the Ministry of Food, that the present price of f.m.s. Straits copra is about £12.15 per ton.

Coconut oil was sold in July at an average price of $7.50 per picul f.o.b.

Copra cake was quoted throughout the month at $1.10 per picul as compared with the June average of $1.18.

Rice.—The Singapore average wholesale prices of rice per picul in July were as follows: Thai No. 2 Ordinary $5.25, Thai No. 1 Broken (White) $4.37. Thai No. 2 Broken (White) $4.26. There were no dealings in Rangoon No. 1, Rangoon Parboiled No. 2, and Saigon No. 1 (Long Grain).

The May average retail prices per gantang (gallon) of No. 2 Thai rice were: Singapore 28, Penang 29, Malacca not quoted, as compared with 29, 29 and not quoted, respectively in April.

The average declared trade value of imports during May was $4.29 per picul, as compared with $4.32 in April and $4.61 in March.

Padi.—The Government Rice Mills, Perak, are paying a guaranteed price of $2.50 per picul for padi, plus a bonus of 10 cents per picul for pure strain S.K. 48 padi. The Government Rice Mill, Temerloh, Pahang, was paying $2.25 per picul during July.

Retail prices of padi per 100 gantangs (gallons) were as follows:— Province Wellesley and Penang $10, Pahang $8 to $15, Selangor $12 to $15, Negri Sembilan $9 to $12 ($15 to $16 Seremban and coast), Johore $15 to $17, Kedah $8, Labuan $10 kampong, $14 town, Brunei $10 to $12.

Pineapples.—Business is at a standstill, and nominal prices for the canned product and fresh fruit prices remain unchanged.

Beverages.

Tea.—No London prices are available.

The latest Colombo prices available, quoted from *The Ceylon Tea Market Report* of 16th July, 1940, of the Colombo Brokers' Association are as follows in rupee cents per lb.—High Grown 84, Medium Grown 64, Low Grown 51.

Coffee.—Liberian coffee fell from $17 to $16.50 per picul, averaging $16.90. Excelsa fell from $15.50 to $15, averaging $15.10, and Robusta fell from $9.50 to $9 at the close, averaging $9.40.

The average of highest and lowest quotations in Singapore for Palembang coffee was $10.19 to $12.81 per picul, and for Sourabaya coffee $13.12 to $15.31. The June average prices were $14.37 to $17.44 and $10.31 to $12.56 respectively.

Spices.

Arecanuts.—The average of the Singapore Chamber of Commerce quotations per picul, which were stated to be approximate, were:— Best $4.69, Medium $4.12, Mixed $3.62.

The averages of the highest and lowest quotations per picul in Singapore were as follows:— Splits $4.56 to $6.37, Red Whole $4.50 to $6.12, Sliced $7.96 to $10.37, as compared with $4.25 to $6.63, $5.37 to $6.68, and $9.56 to $13.12 respectively in June.

Pepper.—There was no demand in the Singapore market and prices fell still further during July. Singapore Black fell to $6.50, averaging $6.75 per picul, and Muntok White fell to $12.50 averaging $12.75 as compared with $7.55 and $13.75 respectively in June. The market for Singapore White continued nominal with no quotations.

Nutmegs.—There was no demand for spices and 110's fell from $24 to $21 per picul, averaging $22. 80's fell from $25 to $22, averaging $23, as compared with $26.80 and $32.80 respectively in June.

Mace.—Siouw continued a nominal market with no quotations. Amboina fell still further from $45 to $40, averaging $44 per picul as compared with $51.60 in June.

Cloves.—Remained a nominal market with no quotations.

Cardamoms.—Green cardamoms were quoted in *The Ceylon Chamber of Commerce Weekly Report* of 22nd July, 1940, from Rs. 0.90 to Rs. 1.10 per lb.

Miscellaneous.

Derris.—The revival of demand in June was of short duration, and in spite of heavy shipments prices weakened slightly further. Average prices per picul for July were as follows:—$10 to $11 for roots sold on a basis of ether extract; $20 to $22 for roots sold on rotenone content. June average prices were $10.50 to $11.50, and $20 to $22.50 respectively.

Gambier.—Cube No. 1 continued unchanged at $17 per picul. The market for Block remained nominal with no quotations.

Sago.—Lack of demand caused the market to fall heavily. Pearl fell from $7.25 to $6 per picul, averaging $6.62, and Flour, Sarawak Fair, fell from $5.50 to $3.50, averaging $4.72. The June average prices were $8.40 and $5.90 respectively.

Tapioca.—Flake Fair fell from $7.50 to $7 averaging $7.25 per picul. Seed Pearl fell from $8 to $7 averaging $7.38 and Medium Pearl fell from $8.50 to $8, averaging $8.12. The June average prices were $8.30, $8.80 and $8.90 respectively.

Tobacco.—Prices of prepared tobacco per picul in Kelantan during July were: 1st quality $120 to $160, 2nd quality $80 to $128, $50 to $112. In Johore dried leaf ranged from $15 to $40, and prepared tobacco from $40 to $144. In Selangor cut tobacco was sold at 80 cents to $1.25 per kati. In Negri Sembilan the range for cured leaf was: 1st quality $25 to $28, 2nd quality $16 to $25, 3rd quality $10 to $18; in Pahang the range was $24 to $35, $15 to $25 and $5 to $15. In Pahang South 1st quality was $28 to $45, and cut tobacco $64 to $96. In Kedah cured leaf was $40, and in Penang and Province Wellesley 1st quality $40, 2nd quality $34.

MALAYAN AGRICULTURAL EXPORTS, MAY, 1940.

Product	Net Exports in Tons				
	Year 1939	Jan./May 1939	Jan./May 1940	May 1939	May 1940
Arecanuts ...	38,489	15,881	20,603	1,499	5,167
Coconuts fresh†‡ ...	97,275†	39,755†	35,476†	5,301†	8,316†
Coconut oil‡ ...	61,360	23,370	29,404	5,850	7,690
Copra‡ ...	34,420	9,614	3,066	2,867	1,597
Copra cake ...	10,707	3,053	4,199	676	102*
Gambier, all kinds ...	1,572	760	495	177	239
Palm kernels ...	10,774	4,387	4,119	1,018	750
Palm oil ...	59,712	18,438	19,718	2,458	4,900
Pineapples, canned ...	65,802	38,487	21,851	10,224	4,948
Rubber¶ ...	361,484¶	131,478¶	216,029¶	25,021¶	41,140¶
Sago,—flour ...	9,583	3,128	1,663	506	671
,, —pearl ...	3,883	1,547	1,532	364	317
,, —raw ...	4,435*	1,940*	2,808*	448*	616*
Tapioca,—flake ...	1,068	454	427	119	85
,, —flour ...	2,706*	1,352*	848*	265*	325*
,, —pearl ...	18,277	6,961	6,501	1,776	1,934
Derris ...	1,356	580	548	150	63
‡Copra equivalent ...	136,075	48,385	51,024	12,484	14,135

† hundreds in number. * net imports. ¶ production.

MALAYAN PRODUCTION OF PALM OIL AND KERNELS

(In long tons, as declared by Estates).

Month 1940	Palm Oil			Palm Kernels		
	F.M.S.	U.M.S.	Malaya	F.M.S.	U.M.S.	Malaya
January ...	2,007.6	2,474.0	4,481.6	434.3	497.0	931.3
February ...	1,937.9	1,914.7	3,852.6	411.1	454.0	865.1
March ...	2,081.5	1,895.6	3,977.1	445.3	388.1	833.4
April ...	2,104.3	1,820.7	3,925.0	420.8	370.0	790.8
May ...	2,124.3	2,054.1	4,178.4	414.5	401.0	815.5
June ...	2,128.8	2,696.0	4,824.8	268.6	505.0	773.6
Total ...	12,384.4	12,836.5	25,220.9	2,394.6	2,615.1	5,009.7
Total January to June, 1939 ...	13,480.3	12,616.9	26,097.2	2,435.9	2,116.1	4,552.0
Total for the year 1939 ...	30,157.7	27,215.0	57,372.7	5,639.3	4,533.1	10,172.4

Stocks on estates as at 30th June, 1940, were: palm oil 4,435 tons, palm kernels 1,888 tons.

ACREAGES OF TAPPABLE RUBBER ACTUALLY TAPPED AND NOT TAPPED ON ESTATES OF 100 ACRES AND OVER, FOR THE MONTH ENDING 30TH JUNE, 1940.

STATE OR TERRITORY	Estimated Acreages of Tappable Rubber (9)+(11)	ACREAGES OF TAPPABLE RUBBER NOT TAPPED				Area of tappable rubber never been tapped (b)		Total area not tapped (3)+(5) (c)		TOTAL AREA TAPPED DURING THE MONTH		Area of tappable rubber rested under rotational systems (c)	
		On estates which have entirely ceased tapping		On estates which have partly ceased tapping (a)									
		Acreage	Percentage of (3) to (2)	Acreage	Percentage of (5) to (2)	Acreage	Percentage of (7) to (2)	Acreage	Percentage of (9) to (2)	Average	Percentage of (11) to (2)	Acreage	Percentage of (13) to (2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
S.S.—													
Province Wellesley ...	42,471	114	.3	9,769	23.0	490	1.2	9,883	23.3	32,588	76.7	7,753	18.3
Malacca ...	115,008	1,348	1.2	17,080	14.8	1,305	1.1	18,428	16.0	96,580	84.0	24,897	21.6
Penang ...	2,601	nil	nil	817	31.4	55	2.1	817	31.4	1,784	68.6	60	2.3
Singapore ...	30,979	4,661	15.1	6,334	20.4	390	1.3	10,995	35.5	19,984	64.5	3,078	9.9
Total S.S. ...	191,059	6,123	3.2	34,000	17.8	2,240	1.2	40,123	21.0	150,936	79.0	35,788	18.7
F.M.S.—													
Perak ...	279,665	5,065	1.8	37,228	13.3	6,343	2.3	42,293	15.1	237,372	84.9	39,905	14.3
Selangor ...	309,326	2,904	0.9	29,868	9.7	4,409	1.4	32,772	10.6	276,554	89.4	46,187	14.9
Negri Sembilan ...	255,953	4,914	1.9	41,261	16.1	7,216	2.8	46,175	18.0	209,778	82.0	32,727	12.8
Pahang ...	85,302	1,023	1.2	12,669	14.9	4,189	4.9	13,692	16.1	71,610	83.9	8,512	10.0
Total F.M.S. ...	930,246	13,906	1.5	121,026	13.0	22,157	2.4	134,932	14.5	795,314	85.5	127,331	13.7
U.M.S.—													
Johore ...	471,902	8,322	1.7	77,302	16.4	32,408	6.9	85,624	18.1	386,278	81.9	57,104	12.1
Kedah ...	195,477	6,638	3.4	15,346	7.8	6,002	3.1	21,984	11.2	173,493	88.8	35,435	18.1
Kelantan ...	31,068	403	1.3	4,878	15.7	872	2.8	5,281	17.0	25,787	83.0	5,931	19.1
Trengganu (d) ...	4,817	nil	nil	nil	nil	nil	nil	nil	nil	4,817	100.0	2,002	41.6
Perlis (e) ...	1,367	36	2.6	427	31.3	109	8.0	463	33.9	904	66.1	154	11.3
Brunei ...	5,969	nil	nil	1,488	24.9	270	4.5	1,488	24.9	4,481	75.1	1,171	19.6
Total U.M.S. ...	710,600	15,399	2.2	99,441	14.0	39,661	5.6	114,840	16.2	595,760	83.8	101,797	14.3
Total MALAYA ...	1,831,905	35,428	1.9	254,467	13.9	64,058	3.5	289,895	15.8	1,542,010	84.2	264,916	14.5

Notes.—(*a*) Area out-of-tapping on estates which have partly ceased tapping refers to areas definitely being rested and excludes areas on any tapping round.

(*b*) The acreage shown in column (7) is included in columns (3) and (5).

(*c*) Areas of tappable rubber rested under rotational systems are not considered as out-of-tapping and therefore columns (11) and (12) include columns (13) and (14) respectively.

ACREAGE, STOCKS, PRODUCTION, IMPORTS AND EXPORTS OF RUBBER, INCLUDING LATEX, CONCENTRATED LATEX AND REVERTEX.
FOR THE MONTH OF JUNE, 1940, IN DRY TONS.

State or Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres estimated 2		Imports during the month		Imports January to June 1940		Exports including re-exports during the month		Exports including re-exports January to June 1940		Stocks at end of month			Consumption 3	
	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to June 1940	during the month	Jan. to June 1940	Foreign	From Malay States & Labuan	Foreign	From Malay States & Labuan	Foreign	Local	Foreign	Local	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to June 1940
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
MALAY STATES :—																				
Federated Malay States ...	...	4,986	18,532	14,449	81,169	9,123	51,190	Nil	Nil	Nil	Nil	15,043	7,778	89,910	48,159	...	7,612	16,531	126	321
Johore ...	...	2,146	7,074	6,271	36,676	4,877	31,978	Nil	99	Nil	532	4,482	6,354	22,097	48,448	...	3,138	6,493	...	...
Kedah ...	...	317	4,445	3,384	19,567	1,210	8,088	Nil	Nil	Nil	Nil	2,189	3,135	11,575	18,851	...	545	3,487	...	...
Perlis ...	...	19	44	14	95	34	192	Nil	Nil	Nil	Nil	Nil	52	Nil	292	...	35	24	...	...
Kelantan ...	...	339	636	371	2,305	919	5,952	Nil	Nil	Nil	Nil	174	1,146	930	7,385	...	455	490	...	...
Trengganu ...	...	41	215	177	1,095	313	2,086	Nil	Nil	Nil	Nil	5	514	15	3,257	...	52	175	...	...
Brunei ...	...	14	67	58	365	112	558	...	...	...	...	...	186	...	938	...	6	59	...	...
Total Malay States	...	7,862	31,013	24,724	141,272	16,588	100,044	Nil	99	Nil	532	21,893	19,165	124,527	127,330	...	11,843	27,259	126	321
S. SETTLEMENTS :—																				
Malacca ...	...	2,662	1,640	1,320	7,532	758	4,980	Nil		Nil		3,132		15,801		...	2,410	1,420	...	...
Province Wellesley	...	1,395	823	552	2,970	215	1,510	Nil		Nil		9,594		55,097		...	1,705	712	...	...
Penang ...	3,491	2,507	10	24	127	115	670	1,796	20,531	14,754	122,524		Nil		Nil	2,225	2,680	10	...	...
Singapore ...	7,803	18,969	281	153	964	131	464	13,685		103,814		26,195		170,242		5,596	21,910	243	17	100
Labuan ...	...	29	Nil	Nil	Nil	12	88	48		317		Nil		Nil		...	16	Nil	...	...
Total Straits Settlements ...	11,294	25,562	2,754	2,049	11,593	1,231	7,712	15,529	20,531	118,885	122,524	38,921	Nil	241,140	Nil	7,821	28,721	2,385	17	100
Total Malaya ...	11,294	33,424	33,767	26,773	152,865	17,819	107,756	15,529	20,630	118,885	123,056	60,814	19,165	365,667	127,330	7,821	40,564	29,644	143	421

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca.	Johore	Kedah
22	23	24	25	26	27	28
DRY RUBBER	6,619	20,583	2,538	3,709	2,431	278
WET RUBBER	993	1,327	142	428	707	267
TOTAL ...	7,612	21,910	2,680	4,137	3,138	545

TABLE III
FOREIGN EXPORTS

PORTS	For month	Jan. to June 1940
29	30	31
Singapore ...	39,463	256,674
Penang ...	14,351	73,379
Port Swettenham.	6,879	34,584
Malacca ...	121	1,030
MALAYA ...	60,814	365,667

TABLE IV
DOMESTIC EXPORTS 4

AREA	For month	Jan. to June 1940
32	33	34
Malay States ...	40,929	251,146
Straits Settlements	3,895	19,642
MALAYA ...	44,824	270,788

Notes:—

1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained
2. The production of estates of less than 100 acres is estimated from the formula: Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month. + Consumption, *i.e.*, Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [20] − [2] − [3] − [4] − [5] − [9] − [10]. For the Straits Settlements the production of estates of less than 100 acres is represented by sales or exports as shown by cess paid.
3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
4. Columns (33) and (34) represent exports of rubber subject to regulation which, for Singapore and Penang Islands are represented by sales or exports as shown by cess paid.
5. All statements are brought up to date monthly, and any inaccuracies that may be disclosed are corrected in the totals; the latest publication therefore, is always the most reliable.
6. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S.S and F.M.S., at Singapore on 25th July, 1940.

METEOROLOGICAL SUMMARY, MALAYA, JUNE, 1940.

Locality.	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine.		
	Means of			Absolute Extremes						Total.		Most in a day.	Number of days.					Total.	Daily Mean.	Per cent.
	A. Max.	B. Min.	Mean of A and B	Highest Max.	Lowest Min.	Lowest Max.	Highest Min.	At 1 foot	At 4 feet			Amt.	Precipitation .01 in or more	Precipitation, .04 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more			
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.						hrs.	hrs.	
Kuala Lumpur Aerodrome Selangor ...	90.8	73.8	82.3	94	70	85	76	85.1	86.2	6.91	175.5	2.26	17	11	8	1	—	174.75	5.83	47
Port Swettenham Aerodrome, Selangor ...	89.5	73.3	81.4	93	70	85	75	85.9	86.6	7.32	185.9	4.98	11	9	2	—	1	178.90	5.96	48
Sitiawan, Perak ...	90.5	74.7	82.6	93	73	87	77	85.0	85.8	2.14	54.4	0.61	9	9	1	—	—	205.40	6.85	56
Ipoh Aerodrome, Perak ...	91.3	73.9	82.6	95	70	88	76	84.7	85.5	7.39	187.7	3.02	12	10	1	—	2	201.75	6.73	54
Temerloh, Pahang ...	90.9	73.4	82.1	94	70	85	75	87.0	87.5	3.23	82.0	1.58	14	10	1	9	—	176.35	5.88	48
Kuala Lipis, Pahang ...	88.9	73.2	81.1	93	70	82	76	84.3	85.6	10.07	255.8	1.93	15	12	1	25	—	165.75	5.53	45
Kuala Pahang, Pahang ...	87.9	75.7	81.8	92	73	85	78	86.9	88.4	6.43	163.3	3.02	13	10	—	—	—	195.35	6.51	53
Kallang Aerodrome, S'pore ...	86.8	78.8	82.8	89	74	83	82	83.5	84.3	11.37	288.8	2.81	10	9	5	—	—	198.80	6.63	54
Bayan Lepas Aerodrome Penang ...	88.1	75.7	81.9	91	72	84	77	85.4	86.3	7.39	187.7	2.11	13	10	3	—	—	201.20	6.71	54
Malacca Town, Malacca ...	86.2	75.2	80.7	89	71	83	78	84.1	85.8	5.31	134.9	2.46	11	10	2	—	1	197.30	6.58	53
Kluang, Johore ...	88.2	72.8	80.5	93	71	81	77	82.8	83.6	2.77	70.4	0.82	14	11	1	9	—	180.10	6.00	49
Mersing, Johore ...	88.3	73.5	80.9	92	71	84	76	83.9	84.6	2.81	71.4	1.40	13	8	5	—	—	188.50	6.28	51
Alor Star, Kedah ...	88.5	75.0	81.7	92	72	82	77	85.7	87.3	5.28	134.1	1.00	12	10	1	—	—	175.45	5.85	47
Kota Bahru, Kelantan ...	90.1	74.7	82.4	93	70	84	78	86.1	86.4	4.97	126.2	2.05	10	8	2	—	1	190.35	6.35	51
Kuala Trengganu, Trengganu	89.6	73.7	81.7	92	70	86	77	86.1	87.8	3.94	100.1	1.91	7	5	3	—	1	201.50	6.72	54
Labuan ...	87.3	76.9	82.1	90	73	84	80	85.4	87.1	11.31	287.3	2.41	16	14	1	—	—	214.85	7.16	58
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft.	75.2	63.9	69.5	79	60	72	66	73.0	73.5	5.75	146.1	0.90	14	14	1	10	1	139.00	4.63	38
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	73.5	57.7	65.6	78	52	70	63	71.5	70.8	7.68	195.1	2.80	18	16	1	1	1	148.35	4.95	40
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ...	72.5	60.8	66.7	78	59	68	62	*	*	7.68	195.1	2.78	16	14	—	—	1	155.50	5.18	42